

Short Communications

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Corvids in Combat: With a Weapon?

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ABSTRACT.—I report on an incident involving a Steller's Jay (*Cyanocitta stelleri*) and an American Crow (*Corvus brachyrhynchos*) at a feeding platform. After repeated failures to drive the crow from the platform by scolding, approaching and diving at it, the jay flew into a bush where it worked vigorously to break off a stick. Having broken off the twig, the jay, with stick in bill, approached the crow and thrust the pointed stick at it. The crow lunged at the jay which then dropped the stick. The crow picked up the stick and flew after the jay. This appears to be the first case of a bird holding an object and using it in a weapon-like way during an aggressive action against another bird. Received 19 October 2005. Accepted 27 July 2006.

On 26 April 2004 at 0655 hrs MST I observed the following interaction at a bird feeding station in Flagstaff, Arizona at 2,000 m elevation. The feeding platform measured 1 × 1 m and was within 2.3 m of the window through which the observations were made. The roof overhang was 2.2 m. from the center of the platform and 2.7 m above it.

OBSERVATIONS

A solitary American Crow (*Corvus brachyrhynchos*) was on the platform eating seeds. A pair of Steller's Jays (*Cyanocitta stelleri*) flew into a mountain mahogany (*Cercocarpus montanus*) shrub that borders the platform. The platform was stocked daily with a variety of seeds commonly eaten by local birds. Steller's Jays regularly feed at the platform, eating and carrying sunflower seeds off to cache. Crows only occasionally visit the platform and are selective about which seeds they pick up in their bills. Thus, they feed deliberately and slowly, and spend considerable time on the platform.

One of the Steller's Jays flew to the edge of the platform and scolded loudly while fac-

ing the crow for about 10 sec. The crow paid no heed to the scolding jay as it continued feeding. The jay on the platform then made feinting movements toward the crow with its bill extended in the direction of the crow. The jay cautiously and haltingly approached the crow as if to attempt to pull its tail or peck it. The jay approached to within 7–10 cm of the crow and appeared to be in the throes of a "fight or flight" conflict. The crow then turned to face the jay and hopped in its direction. The jay quickly hopped backwards. The jay again approached the crow making jabbing motions toward it as it continued to scold loudly. Each time the jay approached, the crow turned to face it and make a slight lunging movement toward it. This exchange was performed six times. The jay then flew to the roof of the house directly above the crow and scolded loudly for 5–6 sec. The crow continued to pick seeds from the platform. The jay then swooped down toward the crow just missing its head and back. The crow jumped at the jay but no bodily contact occurred. The jay again flew onto the roof and called loudly for 5–6 sec. The jay then dived a second time at the crow, again narrowly missing its head and back. The crow continued to feed from the platform.

The jay then flew into the mountain mahogany and vigorously worked with its bill to break off a twig from a dead branch. The jay succeeded in breaking the twig from the branch and held it in its bill so that it pointed forward. The twig was about 10 cm in length, and about 0.75 cm in diameter. The twig end in the jay's bill was rather blunt; in contrast, the other end was pointed. The jay then flew to the feeding platform with the twig in its bill. The jay lunged at the crow with the pointed end of the twig directed at the body of the crow. The stick missed the crow by only a few cm. As the jay approached, the crow lunged quickly at it. The jay flew up with a startled jump backwards, wings extended, and again

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landed on the platform and dropped the twig onto the platform. The crow then picked up the twig in its bill and lunged at the jay with the stick pointed at the jay. The two jays then flew off and the crow followed them with the twig in its bill.

Was the twig a weapon? If so, do we define a weapon as a tool? In animal behavior, usual definitions of a tool indicate that tools must be extensions of the body of the organism that are used in a way that allows the organism to exploit a resource or situation that could not be exploited without the object used as a tool. Also, in the case of birds, the tool must be an extension of the bill or feet. In the usual sense, the meaning of "extension of the bill" would refer to a feeding apparatus, but bills are also used by birds in aggressive interactions. Thus, even in the strictest sense this case appears to be one of tool use. The twig was a tool that was used as a spear or a lance to be thrust at a potential enemy as an extension of the bill. The purpose for using the twig as a weapon was, ostensibly, to drive the crow from the feeding platform, something the jay had failed to do by scolding, approaching aggressively, and aerial attack. The jay may have viewed the crow as a food competitor or as an impediment blocking its access to the feeder. Whether or not it was the jay's intention to use the twig as a weapon when it returned to the feeding platform with it, the twig appeared to take on this function. The crow's intentional use of the twig as a weapon is more problematic given that it had previously "lunged" at the jay without a tool. An alternate explanation might be that the crow picked up the twig out of curiosity and then lunged at the jay because it was close by.

The jay broke the twig off the shrub. The twig was of such a length and width that it could be easily manipulated by the jay. This behavior can be cautiously interpreted as weapon construction. Having failed to drive the crow from the platform using three other methods, the jay used a twig as a lance against the crow. Possibly, the crow then proceeded to use this newly acquired weapon against the jay. In this scenario both species were using a tool against each other, first the jay against the crow and then the crow against the jay.

DISCUSSION

Tool use by birds has received considerable recent attention (Lefebvre et al. 2002; Emery and Clayton 2004a, 2004b). These authors conclude that tool use by birds is more common than previously thought. Lefebvre et al. (2002) recently catalogued all reported cases of tool use by all birds that were published in 68 short note sections of journals as well as previous reviews. They found 39 "true" use of tools (objects detached from the substrate and held in foot or mouth, McFarland 1982) and 86 "borderline" cases (defined as objects that are of the substrate such as anvils, wedges, thorns, and bait) (Hansell 1987, Vauclair 1997). The Common Crow used the most techniques ($n = 5$) with other members of the Corvidae also possessing an impressive repertoire of tool uses. For example, Blue Jays (*Cyanocitta cristata*), close relatives of Steller's Jays, were observed tearing paper and using it to rake in food from outside their cages (Jones and Kamil 1973). The New Caledonian Crow (*Corvus moneduloides*) may use the most complex tool construction and use behavior of any known bird. They have been observed constructing tools of different types to solve different types of foraging challenges. Useful tools are then carried around during foraging bouts (Hunt 1996; Chappell and Kacelnik 2002, 2004).

Tool use by corvids should not be that surprising given their large brain (Marzluff and Angell 2005) and considerable cognitive abilities (Emery and Clayton 2004a, 2004b; Emery 2006). Lefebvre et al. (2002) found a positive correlation between true tool use and brain size. Tools used as weapons, however, seem less common in birds. Corvids have been known to drop objects on humans that are threatening nests or offspring (Caffrey 2001), and Boswell (1983) cites a case of a Black Eagle (*Aquila verreauxii*) dropping sticks on nest intruders.

Behaviors that are classically associated with lance or spear use were observed in this bout. The jay first *selected* and *prepared* an object that could readily be used as a spear, and then *lunged* at the crow with the spear, the crow startled the jay which then dropped the twig. The crow retrieved the twig and possibly used it against *the* jay. The current report

may be the first incident of a bird holding an object and using it in a weapon-like fashion during an aggressive action against another bird. The incident reported herein adds to our understanding of how a variety of items in a bird's environment may be used to aid in pursuit of resources and to gain control over their living space.

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Turkey Vultures Use Anthropogenic Thermals to Extend Their Daily Activity Period

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ABSTRACT.—We describe predictable nocturnal soaring flight in Turkey Vultures (*Cathartes aura*) feeding at a landfill in eastern Pennsylvania. Birds feeding at the landfill returned to their roosts each evening by gaining altitude while soaring in thermals above flared methane vents at the site. Our results highlight behavioral plasticity in this species, which, in part, may explain why Turkey Vultures are so com-

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Turkey Vultures (*Cathartes aura*) are energy minimizers like most avian scavengers (*sensu* Schoener 1971, Ruxton and Houston 2002). Individuals at rest maintain low metabolic rates for their body mass and reduce their core body temperature at night in apparent efforts to conserve energy (Heath 1962, Wasser 1986). Turkey Vultures in flight usually soar and glide when flying between roosts and previously located food, when searching